



American  
Stroke  
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A division of the  
American Heart Association.

# Explaining Stroke



# Introduction

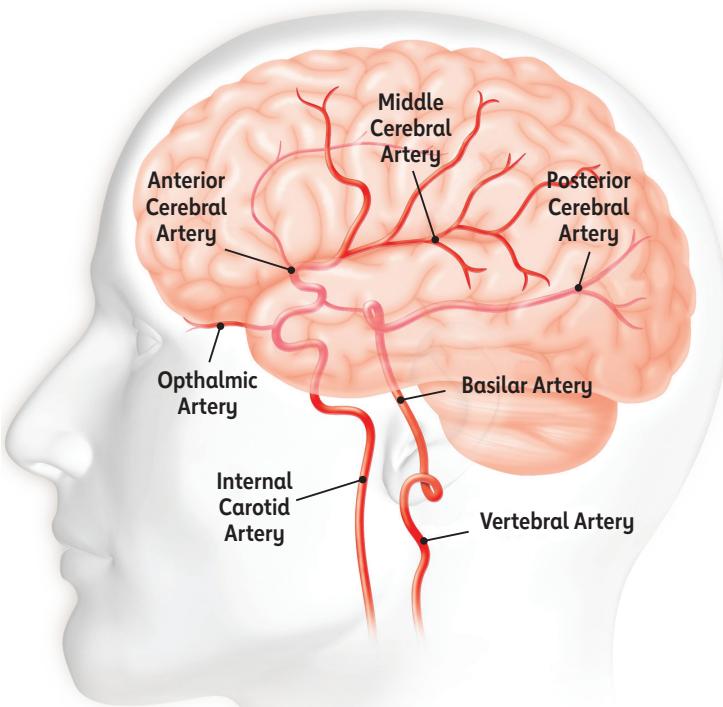
Explaining Stroke is a practical step-by-step booklet that explains how a stroke happens, different types of stroke and how to prevent a stroke. Many people think a stroke happens in the heart, but it happens in the brain.

**Read on to learn more.**

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# What is a Stroke?

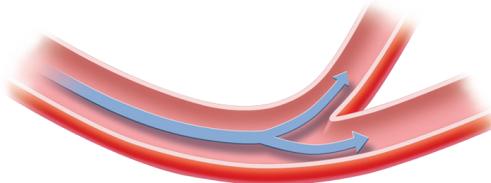


Blood vessels that carry blood to the brain from the heart are called **arteries**. The brain needs a constant supply of blood, which carries the oxygen and nutrients it needs to function. Specific arteries supply blood to specific areas of the brain. A **stroke** occurs when one of these arteries to the brain is either blocked or bursts. As a result, part of the brain does not get the blood it needs, so it starts to die.

# Blood Flow in Normal and Blocked Arteries

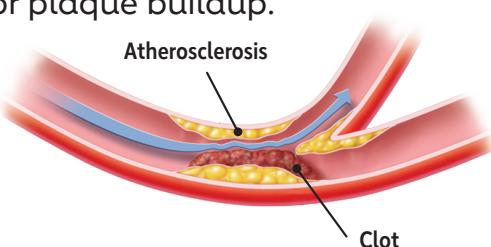
## NORMAL ARTERY

Blood flows easily through a clear artery.



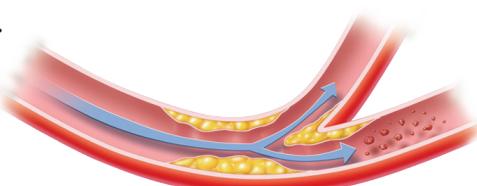
## BLOCKAGE

An artery can become blocked by **plaque** (a fatty substance in the wall of the artery) or a **blood clot**, which reduces blood flow to the brain and causes a stroke. This picture shows **atherosclerosis**, a hardening of the arteries. Atherosclerosis is caused partly by cholesterol or plaque buildup.

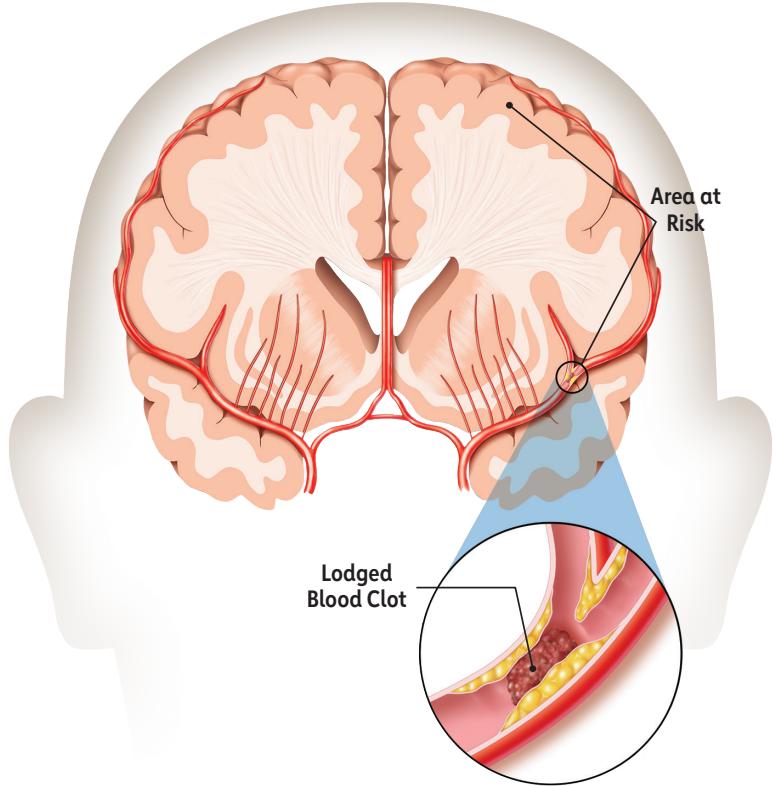


## CLOT DISSOLVES

A transient ischemic attack or TIA has the same signs and symptoms of a stroke, but they only last a short time. The plaque or blood clot breaks up and blood flow is restored to the brain and there is no permanent damage. A TIA is serious and needs to be evaluated by a health care provider.

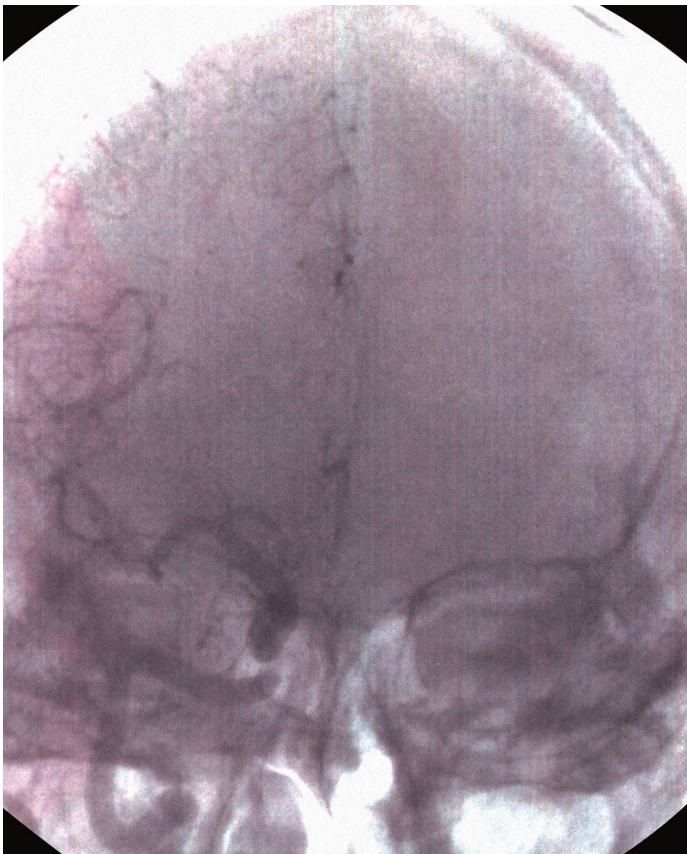


# Blood Flow to the Brain



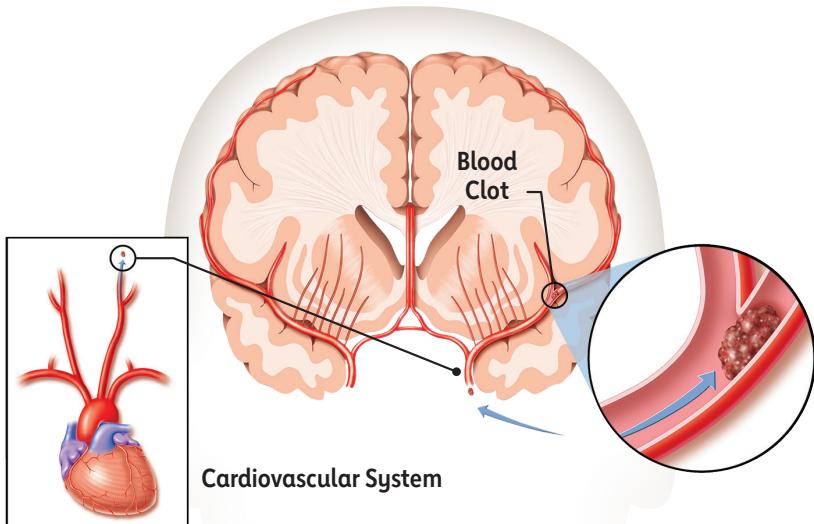
This picture shows a blood clot blocking an artery in the brain. Without enough blood flow, brain cells begin to die.

# Arteriography



The doctor will take an x-ray picture of your brain, called an **arteriogram** or **angiogram**. A dye is injected into the blood vessels that lead to the brain. The dye will show up on the x-ray and help locate blocked, narrowed or damaged blood vessels in the brain.

# ■ Ischemic Stroke



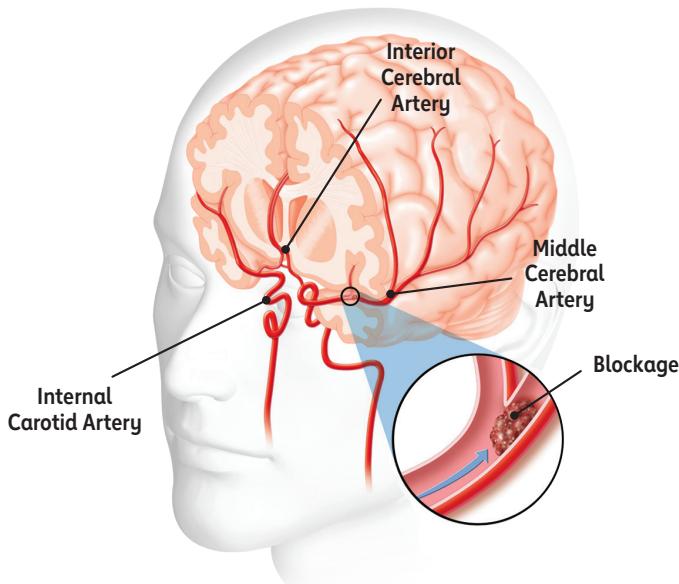
## Ischemic Stroke

**Ischemic stroke** is the most common type of stroke. An ischemic stroke happens when an artery in the brain is blocked. There are two types of ischemic stroke:

**Embolic Stroke:** In an embolic stroke, a blood clot or plaque fragment forms, usually in the heart or the large arteries leading to the brain, and then moves through the arteries to the brain. In the brain, the clot blocks a blood vessel and leads to a stroke.

**Thrombotic Stroke:** A thrombotic stroke is a blood clot that forms inside an artery that supplies blood to the brain. The clot interrupts blood flow and causes a stroke.

# ■ Transient Ischemic Attack (TIA)

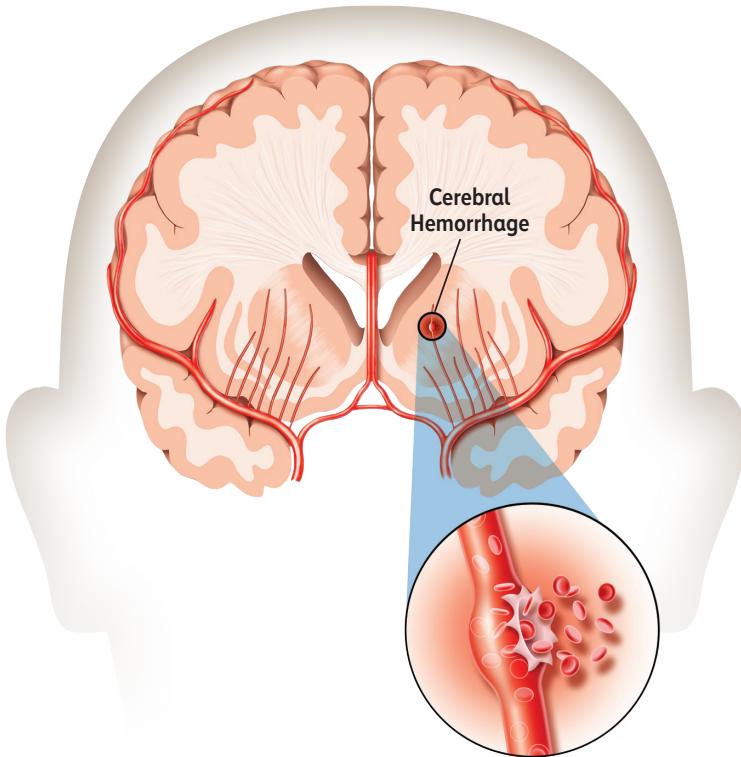


If an artery in the brain or one that goes to the brain is blocked for a short time, blood flow slows down or stops. This can cause a **transient ischemic attack**, sometimes called a mini-stroke. A TIA's major symptoms include sudden:

- Numbness, weakness or paralysis of the face, arm or leg, usually on one side of the body
- Loss of vision in one or both eyes or double vision
- Trouble speaking or difficulty understanding others
- Loss of balance or coordination
- Severe headache with no known cause

When a TIA happens, the artery either becomes unblocked after a short time or a new path opens up and blood flow is normal. Symptoms last for a short time and then disappear. A TIA is a serious warning that you might have a stroke.

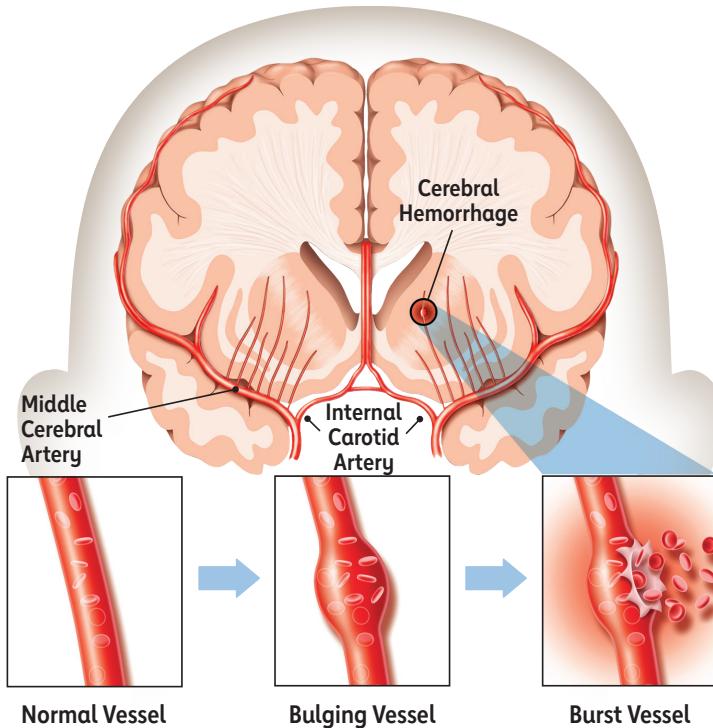
# ■ Hemorrhagic Stroke



A **hemorrhagic stroke** happens when a blood vessel in the brain bursts and spills blood into or around the brain. High blood pressure and aneurysms (see page 12) can make blood vessels weak enough to burst.

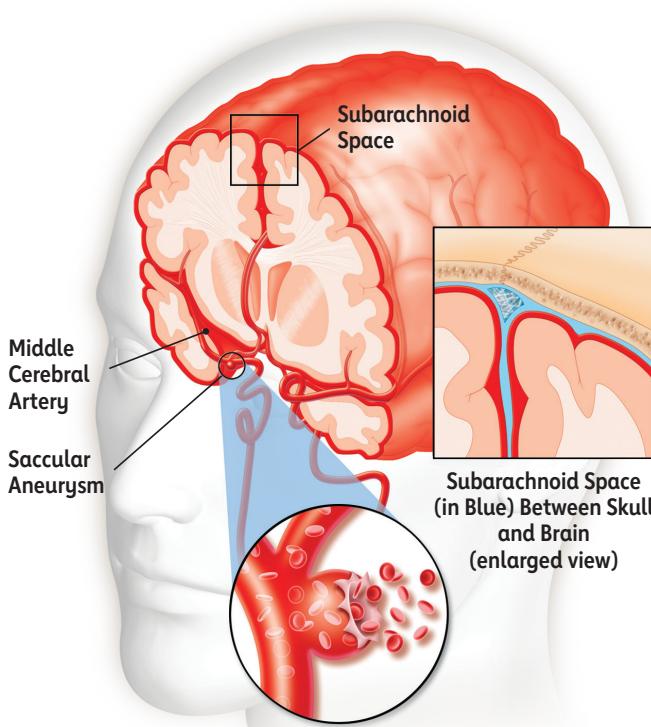
There are different types of hemorrhagic stroke, including intracerebral hemorrhage and subarachnoid hemorrhage.

# ■ Intracerebral Hemorrhage



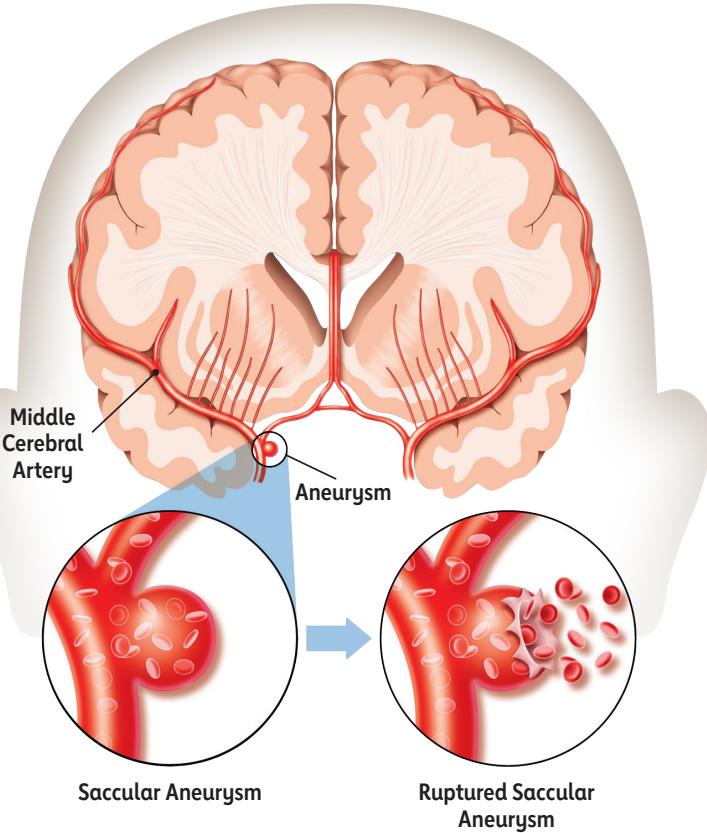
One kind of hemorrhagic stroke is called an **intracerebral hemorrhage**. This kind of stroke is caused when a burst blood vessel bleeds into brain tissue. The bleeding causes brain cells to die and the part of the brain that is affected stops working correctly. High blood pressure, also called **hypertension**, is the most common cause of this type of stroke.

# ■ Subarachnoid Hemorrhage



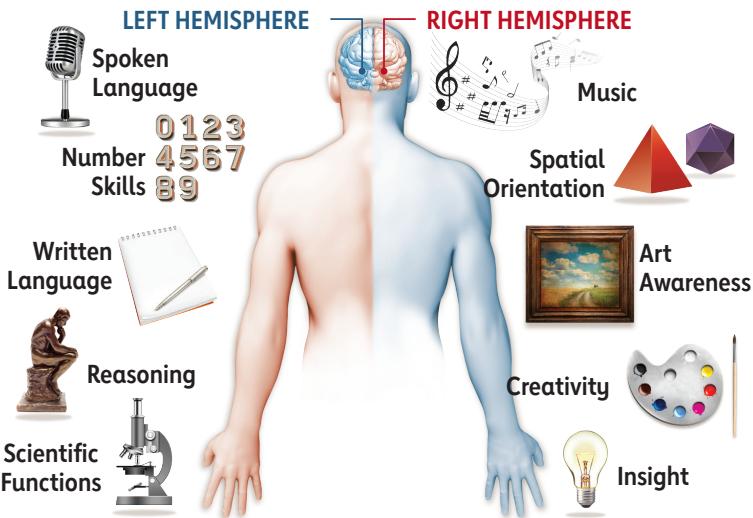
Another kind of hemorrhagic stroke is called a **subarachnoid hemorrhage**. In this type of stroke, a blood vessel bursts near the surface of the brain and blood leaks into the space between the brain and the skull (the subarachnoid space). Blood that collects in this space puts pressure on brain tissue and causes blood vessels to spasm. This type of stroke can be caused by different things but is usually caused by a burst aneurysm.

# ■ Aneurysm



An **aneurysm** is a weak spot on the wall of an artery that bulges out into a thin bubble. As it gets bigger, the wall may weaken and burst. If it bursts, blood leaks inside or around the brain.

# How a Stroke Affects You



## The Sides of the Brain

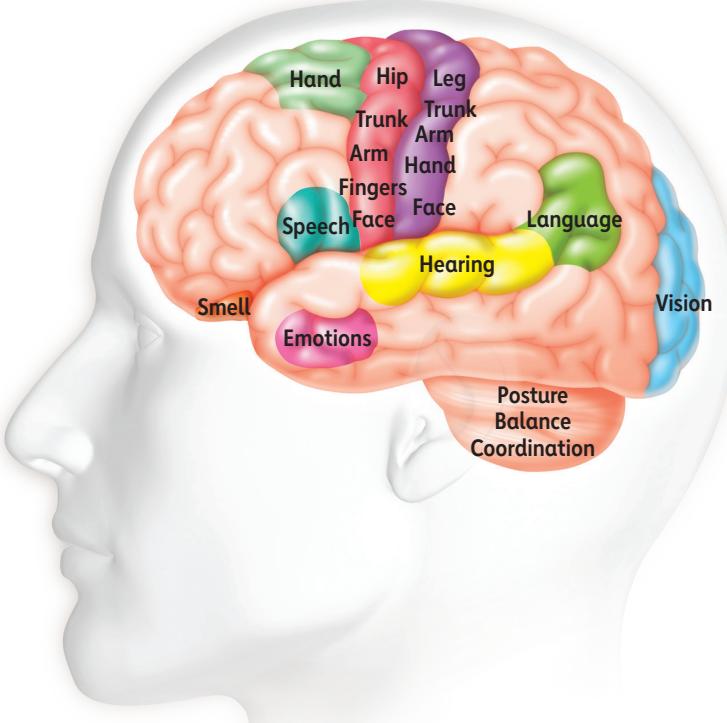
A stroke on the left side of the brain affects the right side of the body and you may experience some of the following:

- Speech and language problems
- Inability to read, write and learn new information
- Impaired ability to do math or to organize, reason and analyze things

A stroke on the right side of the brain affects the left side of the body and you may experience some of following:

- Problems with depth perception or directions, such as up or down, and front and back
- Inability to be creative, such as painting a picture, or to appreciate art and music
- Failure to recognize the emotion in someone's voice

# Moving and Sensing Things



The human brain has different areas that control how the body moves and feels. When a stroke damages a certain part of the brain, that part may not work as well as it did before. This can cause problems with walking, speaking, seeing or feeling. There may be challenges with basic self-care such as bathing or dressing, eating, swallowing, memory, emotions and understanding surroundings that should be familiar.

# Some Effects of Stroke

After a stroke, you may have emotional and physical changes. Depending on the amount of brain damaged and the part of your brain that was affected, you might have problems with:

<b>seeing</b>	<b>sleeping</b>
<b>having seizures</b>	<b>controlling your bladder or bowels</b>
<b>moving parts of your body</b>	<b>pain</b>
<b>fatigue</b>	<b>thinking</b>
<b>memory</b>	<b>depression</b>

# Prevent Another Stroke

If you've had a stroke, you're at risk of having another one. Do these things to prevent another stroke.

**If you have high blood pressure, lower it.** Measurement of 130/80 mm Hg and above is considered high blood pressure, work with your health care provider to manage it.

**Find out if you have atrial fibrillation (AFib).** AFib is a quivering or irregular heartbeat that can lead to blood clots and cause a stroke. Your health care provider can tell you if you have AFib and help you manage it.

**If you smoke, stop.** Smoking doubles the risk for stroke.

**If you drink alcohol, do so in moderation.** Heavy drinking can increase your risk for stroke.

**Lower your cholesterol (the fat-like substance in your blood).** Studies suggest ideal total cholesterol levels at about 150 mg/dL, which equals about 100 mg/dL for low-density lipoprotein cholesterol (LDL-C). Lower cholesterol levels are linked with lower rates of heart disease and stroke.

**If you have diabetes, follow your health care provider's advice carefully to get your blood sugar level under control.** Having diabetes puts you at an increased risk for stroke. Talk to your health care provider about a diet that will help you manage your diabetes, such as limiting foods high in added sugars.

**Exercise daily.** Even a little exercise—a brisk walk, swim or yard work—can improve your health and may reduce your stroke risk. Check with your health care provider before starting a new exercise regimen.

**Cut down on sodium and saturated and trans fat.** By reducing these, you can lower your risk for stroke, high blood pressure and heart disease.

# Carotid Artery Disease

**Carotid artery disease**, also called carotid artery stenosis, occurs when fatty deposits (plaques) clog the blood vessels that deliver blood to your brain and head. This condition develops slowly and results in a narrowing of the arteries, increasing your risk of stroke. There are often no symptoms and the first sign may be a stroke or TIA. Regular checkups are important, and your health care provider can listen to the arteries in your neck with a stethoscope for abnormal sounds. Other tests, such as carotid ultrasound, are available and can be recommended by your health care provider.

**Cerebral angiography:** Uses a contrast dye which is injected into the carotid arteries and lets the health care provider see blood flow through the carotid arteries in real time.

To effectively treat carotid artery disease, health care providers recommend to:

- Follow recommended lifestyle habits (see page 16)
- Take medications as prescribed
- Have a medical procedure to improve blood flow:

**Carotid endarterectomy (CEA):** During this surgery, the fatty deposits (plaques) narrowing the arteries in your neck are removed.

**Carotid artery stenting (CAS):** This newer treatment involves the placement of a permanent stent (small, expandable tube) in the artery that holds the artery open.

# Stroke Symptoms

Beyond F.A.S.T., other symptoms you should know include:

- **Sudden numbness** or weakness of face, arm or leg, especially on one side of the body
- **Sudden confusion**, trouble speaking or understanding speech
- **Sudden trouble seeing** in one or both eyes
- **Sudden trouble walking**, dizziness or loss of balance or coordination
- **Sudden severe headache** with no known cause

## **NOTE THE TIME WHEN ANY SYMPTOMS FIRST APPEAR.**

Medical options exist that may reduce the long-term effects of stroke if administered soon after the onset of stroke.



If you have any of these symptoms or see someone else having them, call 911 immediately! Fast treatment at the hospital can have better results.

See page 19 for a test you can use to tell if someone might be having a stroke.

**SPOT A STROKE™**

# **F.A.S.T.**



**FACE**  
Drooping



**ARM**  
Weakness



**SPEECH**  
Difficulty



**TIME**  
to Call 911

Learn about more signs of stroke at  
**[stroke.org](http://stroke.org)**

**For stroke information,**  
call the American Stroke Association  
**at 1-888-4-STROKE** (1-888-478-7653)  
or visit **stroke.org**.

*For information on life after stroke,  
call and ask for the Stroke Family Warm Line.*

**For heart- or risk-related information,**  
call the American Heart Association at  
**1-800-AHA-USA1** (1-800-242-8721)  
or visit us online at **heart.org**.

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